37. $\perp$ to $y = x^3 - 3x + 1$ at $(2, 3)$

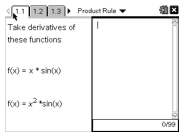
39. points on $y = 2x^3 - 3x^2 - 12x + 20$ where tan $\parallel$ x-axis
slope = 0 = y'

Sep 12-9:00 AM

3.3b Rules for Differentiation

Use Product Rule.tns to discover the rule for taking derivatives of products of functions.

p 119



$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\left\{\frac{d}{dx}(v) = \frac{dv}{dx}\right\}$$

Sep 11-10:09 PM

Take the derivative of $y = (x^2 + 1)(x^3 + 3)$

a) using the product rule

$$\frac{dy}{dx} = (x^2+1)3x^2 + (x^3+3)2x$$
$$= 3x^4 + 3x^2 + 2x^4 + 6x$$
$$= 5x^4 + 3x^2 + 6x$$

b) foil and take the derivative

$$y = x^5 + 3x^2 + x^3 + 3$$
$$\frac{dy}{dx} = 5x^4 + 6x + 3x^2$$

Sep 11-10:12 PM

The Quotient Rule

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

Differentiate $f(x) = \frac{x^2 - 1}{x^2 + 1}$

$2x^3 + 2x - 2x^3 + 2x$

$$f'(x) = \frac{(x^2+1)2x - (x^2-1)\cdot 2x}{(x^2+1)^2}$$

calc: $\frac{4x}{(x^2+1)^2}$

Sep 11-10:13 PM

Power rule for negative integer powers of x

$$\frac{d}{dx}\left(\frac{1}{x}\right) = \frac{d}{dx}(x^{-1}) = -x^{-2} = -\frac{1}{x^2}$$

$$\frac{d}{dx}\left(\frac{1}{x}\right) = \frac{x\cdot 0 - 1\cdot 1}{x^2} = -\frac{1}{x^2}$$

use quotient rule

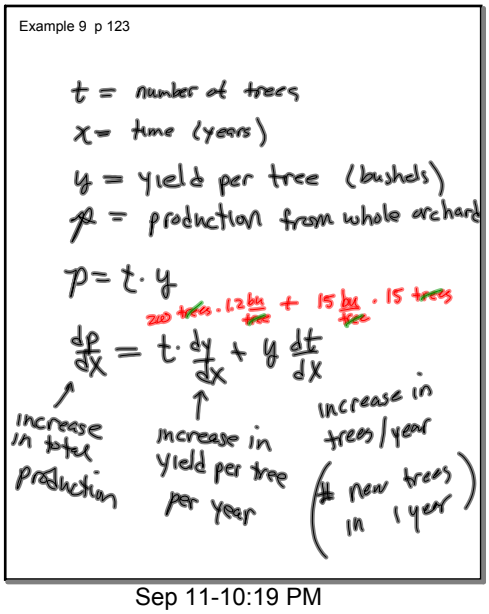
Sep 11-10:16 PM

Find an equation for the line tangent to the curve $y = \frac{x^2 + 3}{2x}$ at x=1

$$y' = \frac{(2x)2x - (x^2+3)\cdot 2}{(2x)^2}\Bigg|_{x=1} = \frac{4 - 4\cdot 2}{2^2} = -1$$

$y = -(x-1) + 2$

Sep 11-10:17 PM



Sep 11-10:19 PM